A Web Based Mumps Virtual Machine

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This paper describes the development of a virtual machine environment to support decentralized, Mumps based medical record applications on the World Wide Web this allows construction of efficient, fully functional, platform independent, multi-point medical record information systems which can be accessed anywhere by low cost Web browsers to search, retrieve, download and analyze patient information. It also allows legacy Mumps applications to operate in the heterogeneous Web system platform environment along with Web graphical, sound and video presentation services.

In the distributed environment of the World Wide Web, platform independence, the ability to run a program on any combination of operating system and hardware, is of critical importance if a host web server is to send programs to client browsers executing in unknown environments. Platform independence is one of the more important features of a language like Java. It is accomplished by developing a transportable virtual machine environment for the language for each target hardware and operating system so that programs behave exactly the same, regardless of the host on which they ultimately execute.

This paper presents a platform independent Mumps virtual machine that, unlike Java and other web languages, is especially geared to clinical applications and supports the following features: ● it is derived from Mumps and provides a full range of string handling routines and builtin functions; ● it runs under Unix, OS/2, Win95 and Win/NT environments; ● it provides full and easy access to user entered HTML *form* data; ● it has several extensions that aid in return of HTML document code to the server and client; ● it provides a B-tree based hierarchical and relational data base facility; ● it permits access to operating system facilities including other script processors and data base management systems; ● it is scalable from PC's to mainframes; ● it is small, efficient, quickly loaded and executed, and it co-exists with other server based applications; ● it can access all system facilities such as SQL, DB2 and Oracle; ● it permits legacy Mumps based software to run directly on the Internet; ● it can both execute software sent from clients and it can download software applets for client execution; ● and it can be run in standalone mode with or without a Web browser.

The system based on a compact Mumps virtual machine for the 1986 standard of the Mumps language written in C++. The virtual machine module generally is about 75,000 bytes of code which is comparable to Java VM's. Since this Mumps processor executes on most commonly used system platforms, it provides a virtual environment in which Mumps programs can execute, independent of the host operating system or hardware configuration. A Mumps program written for one platform executes in exactly the same on any other platform. This feature, which is also one of the primary advantages of Java, means that programs can be distributed by web servers to remote browser clients without regard to the configuration of the target system upon which they will ultimately execute.

This system environment facilitates construction of efficient, fully functional, platform independent, multi-point medical record information systems that can be accessed any-where by low cost Web browsers to search, retrieve, download and analyze patient information. Free copies of this Mumps processor along with documentation for Win95, Win/NT, OS/2, Linux and Sun Solaris operating systems along with a demonstration medical record system and full documentation are available at:

http://www.cs.uni.edu/~okane.

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